

B1 end, and an outer surface including bone engaging means for engaging said implant to adjacent vertebrae of the spine, the outer locus of said bone engaging means forming a substantially frusto-conical configuration along at least a portion of said bone engaging means oriented toward the adjacent vertebrae, said implant being made of a material appropriate for human implantation.

B2 131. (twice amended) A spinal fusion implant for insertion across the disc space between adjacent vertebrae of a human spine, [the] said implant comprising a body having an outer locus larger than the space between two adjacent vertebrae to be fused [said] and having a mesh-like material on the exterior of said body, said mesh-like material having a plurality of interstices for receiving fusion promoting material and for engaging said implant to said adjacent vertebrae of the spine, said implant being made of a material appropriate for human implantation.

REMARKS

Applicant submitted an Information Disclosure Statement on July 9, 1997 but did not receive a signed copy of form PTO 1449 from the Examiner. Applicant respectfully requests the Examiner to provide a signed copy of form PTO 1449. Furthermore, Applicant is submitting concurrently herewith a supplemental Information Disclosure Statement disclosing a recently issued reference to Zdeblick.

Independent claims 1 and 131 have been amended to further define Applicant's claimed invention. It is submitted that claims 1-26, 28-51, 53-75, 77-82, 84-96, 98, 101-132, and 135-167 are patentable over the art of record.

In the Office Action, the Examiner indicated that claim 136 was allowable over the prior art of record. The Examiner also indicated that claims 25, 51, 75, 123, and 130 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

Claims 1-4, 22, 26-29, 48, 53-54, 72, 77, 94, 98-103, 120, 124-126, 131, 137, 138, 145, and 158-162 were rejected by the Examiner under 35 U.S.C. § 102(b) over Kuntz. Independent claims 1, 26, 53, 98, and 124 are directed to an implant having either a body with portions oriented toward adjacent vertebrae that are frusto-conical, bone engaging means with portions oriented toward adjacent vertebrae having an outer locus that is frusto conical, or having both a body and an outer locus of the bone engaging means with portions oriented toward adjacent vertebrae that are frusto-conical. Independent claims 137 and 145 are directed to an implant having arcuate portions oriented toward the adjacent vertebrae with a distance between the arcuate portions increasing from one end to the other end of the implant.

Contrary to the Examiner's assertion, Kuntz does not teach an implant having a body that is frusto-conical or bone engaging means having an outer locus that is frusto-conical. In

Kuntz, the prosthesis 10 has "slightly convex superior and inferior surfaces 11 and 12." (Col.6, lines 11-14). Kuntz discloses that the "convexity of the superior and inferior surfaces 11 and 12 corresponds closely to the slight concavities found in the inferior and superior surfaces of the vertebrae." (Col. 6, lines 21-24). Kuntz further discloses that it "is not essential to make both the superior and inferior surfaces of the prosthesis convex. In particular, the superior surfaces of many vertebrae are almost planar, so the inferior surface of the prosthesis 10 may similarly be planar." (Col. 8, lines 45-49) (emphasis added). Thus, the Kuntz prosthesis is not frusto-conical.

Further, there is no teaching, disclosure, or suggestion in Kuntz for an implant having arcuate portions oriented toward the adjacent vertebrae with a distance between the arcuate portions increasing from one end to the other end of the implant as recited in independent claims 137 and 145. Applicant submits that Kuntz discloses an implant having convex or planar surfaces oriented toward the adjacent vertebrae. Thus, Kuntz does not disclose Applicant's claimed invention recited in independent claims 137 and 145.

Applicant submits that independent claims 1, 26, 53, 98, 124, 137, and 145 are patentable over Kuntz. Applicant further submits that claims 2-4, 22, 27-29, 48, 54, 72, 101-103, 120, 125, 126, 138, and 159-162, are dependent from independent claims 1, 26, 53, 98, 124, 137, 145 or the claims dependent therefrom, respectively, and are allowable over Kuntz at least due to their

dependency from an allowable independent claim.

Independent claim 77 recites an implant having "an outer surface including a plurality of posts spaced apart along at least a portion of said outer surface of said body for engaging said implant to adjacent vertebrae of the spine." Independent claim 131 is directed to an implant having "a mesh-like material on the exterior of said body, said mesh-like material having a plurality of interstices for receiving fusion promoting material and for engaging said implant to said adjacent vertebrae of the spine." Kuntz does not disclose an implant as claimed in independent claims 77 and 131. Applicant submits that independent claims 77 and 131 are patentable over Kuntz. Applicant further submits that claims 94 and 158 are patentable over Kuntz at least due to their dependency from claim 77 or the claims dependent therefrom.

Accordingly, it is submitted that the rejection of claims 1-4, 22, 26-29, 48, 53-54, 72, 77, 94, 98-103, 120, 124-126, 131, 137, 138, 145, and 158-162 under 35 U.S.C. § 102(b) over Kuntz has been overcome.

The Examiner rejected claims 5-21, 23-24, 26, 30-45, 47, 49, 50, 55-71, 73, 74, 78-82, 84-93, 95, 96, 104, 105, 107-119, 121, 122, 127-129, 132, 135, 139-144, 146-151, 153-157, and 163-167 under 35 U.S.C. § 103 over Kuntz alone or in view of one of Bagby, Ray '260, Brantigan '915, and Ray '740. The Examiner relies on Bagby for a bone growth material, a fusion promoting material, a porous outer surface, openings, and an internal chamber. The Examiner relies on Ray '260 for a biabsorbable material and a mesh

like material. The Examiner relies on Brantigan '915 for posts, surface roughenings, and wells. The Examiner relies on Ray '740 for a means for closing an access opening.

As claims 5-21 and 23-24, 26, 30-45, 47, 49, 50, 55-71, 73, 74, 78-82, 84-93, 95, 96, 104, 105, 107-119, 121, 122, 127-129, 132, 135, 139-144, 146-151, 153-157, and 163-167 depend from independent claims 1, 26, 53, 77, 98, 124, 131, 137, or 145, respectively, or the claims dependent therefrom, Applicant submits that they are patentable over Kuntz at least due to their dependency from an allowable independent claim. Accordingly, based on the understood teaching of the references cited by the Examiner, it is respectfully submitted that the claims, as amended, are patentable under 35 U.S.C. § 103 over the references cited, taken alone or in proper combination.

It is submitted that the rejection of the claims under 35 U.S.C. § 103 over Kuntz alone or in view of one of Bagby, Ray '260, Brantigan '915, and Ray '740 has been overcome.

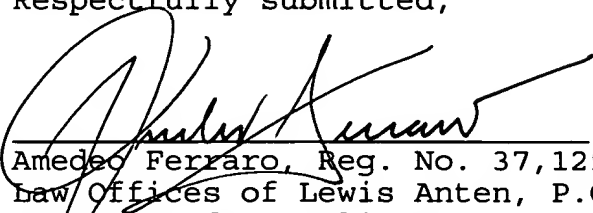
For the foregoing reasons, it is submitted that the pending claims are patentable over the cited art and are now in condition for allowance. A Notice of Allowance is respectfully requested. Should there be any remaining or further questions, the Examiner is requested to please contact the undersigned directly.

If there are any other fees due in connection with the filing of this response, please charge our Deposit Account No. 01-2138. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for in the papers accompanying this

response, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

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